

**Judit Szente and
James Hoot**

Judit Szente is Research/Special Projects Director, King Center Charter School, Buffalo, New York, and Technology/Research Consultant of the United States Agency for International Development Grant in Ethiopia. James Hoot is Professor of Early Childhood Education, Director of Early Childhood Research Center, The University at Buffalo, State University of New York.

A Cyber Ray of Hope for Ethiopian Children

We would like to invite you on a journey to one of the oldest (over 3,000 years old) nations in the world—Ethiopia. In this eastern African country, you will be enchanted by rich historical and cultural treasures. This is the country where one of the oldest direct human ancestors, Lucy, was discovered, and where you can observe ancient churches, temples, mosques, and artifacts. Such sights inspire us to reflect upon this nation's great kings and queens, and prompt our imaginary quests for the legendary Ark of the Covenant—supposedly still being guarded here by a single monk. Because of its rich history, it is not surprising that Ethiopia often is referred to as the “cradle of humanity” (Ethiopian Tourism Commission, 2003). When visiting today, we find ourselves drawn into a rich diversity of language, dance, music, and food.

Major obstacles threaten the future of this great nation, however. Global publicity regarding the drought of 1986 has left the world with images of starving and orphaned Ethiopian children. Such conditions do still exist in parts of this nation, in which 45 percent of the population falls below the national poverty line (*The World Factbook*, 2003). In a nation of such expansive poverty, educational aspirations for those who could change the future, the children, are often subservient to concerns for basic survival. Even when children are fortunate enough to attend school at all, the quality of the schools vastly differs (Hoot, Szente, & Mebratu, in press), and the drop-out rate—especially for females—is very high (United States Agency for International Development [USAID], 2002). In rural areas, where the majority of the population lives, school attendance is further complicated by the view that marriage at a very young age is necessary for many families' economic survival. Girls as young as 5 may be promised to generally older males, with whom they live following a pre-marriage celebration. Such traditions may lead to girls who are only 9-12 years old

becoming pregnant. Severe complications for both the physically immature mothers and the likely premature infants result in even greater entrenchment of the poverty cycle. These, as well as other challenges (such as the AIDS pandemic), promise to lower the current life expectancy of 41 years even more in the near future (*The World Factbook*, 2003).

Addressing the Problem

The Ethiopian Ministry of Education (MOE), in concert with a host of nongovernmental organizations (e.g., Save the Children, UNICEF, USAID, UNESCO), has been working very hard in recent years to change the course of this emerging nation by improving educational opportunities for its children. One such initiative was the 1994 Education and Training Policy (Negash, 1996). This national blueprint targeted education, from kindergarten through the secondary levels, for major improvements. An especially noteworthy feature of this plan is the government's investment in the expansion of basic education (i.e., elementary grade) programs.

Concomitant with the expansion of elementary programs is the increased number of institutions that prepare elementary grade teachers, specifically the Teacher Training Institutes (TTIs) and Teacher Training Colleges (TTCs). Traditionally, following Grade 12, candidates interested in becoming teachers engaged in a year of teacher preparation at TTIs and TTCs. In response to the greatly increased demand for teachers resulting from the recent MOE initiatives, however, candidates now enroll in a one-year teacher preparation program following Grade 10 (MOE, 2002). Even with this accelerated training, not enough teachers are available to staff the expanding basic education programs. To increase the number of teachers and improve their training, the Ministry has begun providing summer inservice programs.

Despite these efforts, however, very few elementary teachers (Grades 1-8) hold a diploma or receive higher level training (Negash, 1996). In rural areas, many teachers are volunteers and have not received any specialized teacher training. Moreover, even when teachers gain specialized content knowledge, most lack pedagogical training (e.g., experience with teaching methods courses and supervised student teaching). Thus, teachers who might be well-prepared in subject content are unprepared to convey knowledge in a manner conducive to children's optimal learning.

Even the few teachers who might normally be effective in conveying content in developmentally appropriate ways confront overwhelming challenges in the classroom realities that offer further barriers to educational improvement. One such barrier is the very high student-to-teacher ratio. In their seven visits to several types of Ethiopian primary schools, the authors of this article regularly observed student-to-teacher ratios of 60:1 or even 80:1. As might be expected, books, supplies, and equipment are in very short supply in these overcrowded classrooms. It is common, for example, to observe four children sitting at a bench desk made for two, sharing, if they are lucky, a single textbook. Furthermore, those textbooks are generally seriously outdated. In such a milieu, it is easy to see why—in opposition to overwhelming data suggesting its ineffectiveness (e.g., Bredekamp & Copple, 1997)—instruction is almost universally teacher-centered and focuses upon rote learning. Such pedagogy methods clash with the demands of our global information society and are unlikely to produce future citizens who are connection-makers, creative and critical thinkers, and collaborators, and who are able to react effectively to rapid change (Kaku, 1997).

Clearly, the future of Ethiopia depends on the welfare of its children. Yet, as has been shown above, the challenges to providing high-quality education to its future leaders are massive. Nevertheless, a number of nontraditional pilot projects are currently underway that offer rays of hope (e.g., www.usaid.gov). Below is a description of one such effort, which employs computer technology as a vehicle for overcoming many of the educational problems described herein.

Transforming Educational Opportunities for Children Through Technology

One of the most significant barriers to improving education in Ethiopia (or in any nation) is a lack of money. Thus, improvement in education *in the future* requires serious attention to preparing children for better paying jobs *in the present*. Securing the higher paying jobs of tomorrow, however, requires training in very different skills from those currently emphasized in Ethiopian

schools. In the United States, for example, Taylor (2000) estimated that more than 60 percent of the jobs in the future will be technology-related. In 2003, a video produced by station WNED-TV in Buffalo, New York, indicated that 8 out of the 10 fastest-growing jobs are technology-related (www.wned.org).

The implications of these data for education at all levels are profound, especially for the developing countries around the world. Consider, for example, the case of India. In 2000, 43 percent of U.S. work visas related to technology were granted to Indians with computer degrees (Thirumurthy & Sundaram, 2003). Armed with technological knowledge, then, developing nations with lower labor costs are in a unique position to secure a greater number of jobs in the global marketplace. While such jobs and related technological education are expanding in some emerging nations, only 20,000 Ethiopians at all levels even used the Internet in 2002 (see Table 1).

To capitalize on the potential for technological skills to improve Ethiopians' economic outlook, a USAID project titled Building Long-Term Collaborations for the Improvement of Primary Education in Ethiopia, in collaboration with Addis Ababa University and the University at Buffalo, was undertaken in 2001. The specific focus of this project was to demonstrate the potential of computer technology within the constraints of Ethiopian primary grade schools.

Since then, a technology classroom has been established in two of the more common types of primary school programs—a government school and a public school. The government school, Tsehay Chora, located in the nation's capital, is funded solely by the gov-

Facts About Ethiopia

Name of Country:	Federal Democratic Republic of Ethiopia
Capital:	Addis Ababa
Location:	Eastern Africa
Borders:	Djibouti, Eritrea, Kenya, Somalia, Sudan
Area:	1,127,127 sq. km.
Population:	66,557,553
Population Below Poverty Line:	45% (2002 est.)
Life Expectancy:	41.24 years
Official Language:	Amaharic (over 80 different languages are spoken)
Main Religions:	Muslim, Ethiopian Orthodox
Median Age of Population:	17.3 years
Literacy Rate:	42.7%
Televisions:	682,000 (2002)
Radios:	15.2 million (2002)
Internet Users:	20,000 (2002)

Source: *The World Factbook* (2003)

Table 1

ernment and caters to children from lower socioeconomic status (SES) families.

Like most government schools, Tsehay Chora provides the most basic of education. The 2,800 children, in Grades 1-8, arrive in two shifts, the better to utilize the space. A public school, Assai, is funded by both the federal government and middle- to upper-SES families. It provides a high-quality education for 2,600 students in grades K-8.

With the help of USAID funds and donations of used computers, 40 computers have been set up in technology labs (the first such labs in the nation) in the two pilot schools. Since training is the most important factor to the success of this project, an expert from the Center for Applied Technologies in Education at the State University of New York in Buffalo worked with project personnel to introduce a pilot group of teachers (six from Grade 7 and six from Grade 3) to the educational uses of technology. These teachers are currently being provided intensive training to learn typing, Microsoft Word, PowerPoint, and FrontPage, and how to send E-mail and conduct Internet research. Once they are comfortable with the programs, the teachers will work with a small group of children selected from their classrooms. In order to address the major issue of early drop-out by females, special attention was given to selecting an equal number of girls and boys for this pilot project.

In addition to the time they have scheduled to use the computer lab during the school day, children in the project are encouraged to work on developing their computer skills after school and during weekends. During those times, the older children (Grade 7) work in teams with the younger children (Grade 3). Plans are also underway to utilize older children as "technology mentors" in a rural school near the city of Jimma. Since the majority of the population lives in rural areas, and given the scarcity of qualified teachers, the use of these mentors appears to be especially promising.

Hope for Children

This project offers countless potential benefits for the future of this nation—the children. These include the implementation of less teacher-directed instructional methodologies, development in academic skills, demonstrated potential for immediate income generation/

better economic opportunities, social/emotional development, and cross-cultural exposure.

Alternative Instructional Methodologies. A major benefit of technology integration is the potential for changing the traditional teacher-directed instructional methodology. In the computer labs, for example, children can work collaboratively on the computers, in small groups or in pairs. In these groups, the children themselves become "teachers" of their peers (Brooker, 2003), as well as teachers of the younger students in their schools.

Academic Skill Development. Children also will develop skills in academic content areas through carefully selected computer programs directed specifically to the elementary grades. Children will have the opportunity, for example, to improve their skills and engage in more complex applications during online tutoring sessions with preservice teachers. With the help of such interventions, students can improve their cognitive skills (Clements & Sarama, 2003), as well as their English-language skills (Peterson, 2000; Thirumurthy & Sundaram, 2003). Students are also able to practice their writing/drawing/painting skills through computer programs that compensate for scarce supplies of paper and writing/drawing tools in their classrooms. Online resources provide them with access to books/readings (e.g., www.icdlbooks.org) on the Internet, as well as a number of multimedia projects related to their academic studies. Soon, they will be able to create their own projects utilizing digital imagery, presentation software, and various research tools (Brooker, 2003; Murphy, DePasquale, & McNamara, 2003).

Income Generation and Better Economic Opportunities. Research (e.g., Peterson, 2000; Thirumurthy & Sundaram, 2003; Warschauer, 2000) suggests that children from all socioeconomic levels can benefit from the use of research-based computer programs and multimedia projects. With their newly developed skills, for example, students can learn to create Web sites and newsletters. Primary grade children also can garner badly needed financial support for schools through the sale of items easily created with technology (e.g., wedding invitations and business cards). Such tech-

Number of Participating Teachers and Children at Pilot Sites

Grade	Teachers	Children
3	three at each site	two girls and two boys selected from each teacher's classroom
7	three at each site	two girls and two boys are selected from each teacher's classroom
Total	12 teachers (6 at each site).	48 children (24 at each site).

Table 2

nological competencies are much more likely to enhance children's future ability to compete in the global marketplace (Thirumurthy & Sundaram, 2003). With such generated income, the chances of getting out of poverty increase for both the students and their families. This may result in more family support for schooling. With more positive family attitudes toward education, students may be less likely to drop out of school. Furthermore, since the present project places equal attention on the technological training and interests of both girls and boys, female students will be equipped with skills that enable them to see a brighter future for themselves, and they will not have to rely on others for their survival.

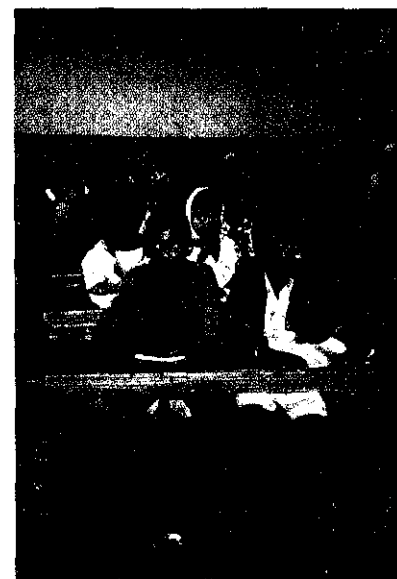
Social/Emotional Development. Clements and Sarama (2003) indicated that "computers can serve as catalysts for positive social interaction and emotional growth" (p. 34). Computers are highly motivating, as students quickly learn the key concepts of operating the system (Peterson, 2000; Thirumurthy & Sundaram, 2003). Children become self-motivated to learn, and they understand how learning will create better lives for themselves. Through solving real-life problems related to their academics, they will be able to have successful experiences, and will be motivated to create more and stay in school. Such motivation also can lead to the habit of life-long learning.

Cross-Cultural Exposure. As Adams and Hamm (2000) indicate, "Internet technology puts the world at the student's fingertips" (p. 2). With such unique learning opportunities available, Ethiopian students will be able to participate in distance learning sessions and establish video-pal partnerships with peers from different parts of the world (National Association for the Education of Young Children, 1996; Szente, 2003). Through these sessions, students will be able to form

friendships and learn about the world through personal connections. Children in both rural and urban areas in Ethiopia will be able to share educational resources (e.g., by creating Web sites) with each other as well as with peers in the United States. Beginning in the fall of 2004, primary grade children from the King Center Charter School (www.kingcentercharterschool.org) in Buffalo, New York, will be assigned to an e-friend from one of the Ethiopian sites being served. In addition to literacy skills nurtured through electronic exchanges, innovative teaching/learning methodologies are being supported through other projects. For example, students from each nation might research a social studies topic, such as "threats to the environment in my city." PowerPoint presentations will be shared to support an environmental awareness from a cross-cultural point of view.

Hope for Teachers

Teachers with little or no training can benefit from technology, such as by gaining access to a world of prepared and tested curriculum materials. Whereas books were previously scarce or non-existent in Ethiopia, teachers now have access to a nearly limitless supply of current volumes. In addition to receiving materials and professional materials, Internet access will join teachers (especially significant for those in rural, isolated areas) to professional colleagues throughout the world. For example, teachers can contact professional organizations (e.g., the National Association of Early Childhood Teacher Educators, the Association for Childhood Education International, and the National Association for the Education of Young Children) to be paired up with colleagues around the world. A host of education materials and resources can be found on these organizations' Web sites. Furthermore, quality online programs (e.g.,



Photos courtesy of authors.

Children at a rural school.

www.wned.org; www.cate.buffalo.edu/html) enable teachers to participate in online training courses. With such projects, the Ethiopian Ministry of Education's efforts will be complemented by providing teachers with pedagogical training as it relates to academic content. Thus, teachers will be able to teach specific academic units in more developmentally appropriate ways as a result of meaningful technology integration, and will contribute to the improvement of education in Ethiopia.

Conclusion

This article describes the efforts of a USAID project being implemented in two primary schools in Addis Ababa, Ethiopia. During the initial years of the project, efforts focused on creating exemplary early childhood programs as well as long-term educational collaborations through the use of educational technology. By introducing computer training at an early age, students will be able to contribute to the economic capital of the country, thus eventually increasing the economic well-being of the entire nation.

Educators need to anticipate future directions, share positive atti-



Tsehay Chora Government School



Assai Public School

tudes toward integration of technology, provide children with adequate skills/knowledge to be able to meet potential challenges of the future, and enhance their lifelong learning (SeokHoon, 2003). With supportive government mandates, integration of technology will have great cultural, economical, social, and programming benefits. To ensure continued success, the collaboration of governments, NGOs, public and private institutions, and media is essential. In closing, therefore, we call for the support of everyone to enable this cyber ray of hope to brighten the future of this ancient land.

References

- Adams, D., & Hamm, M. (2000). Literacy, learning, and media. *Technos Quarterly*, 9(4). Retrieved November 14, 2003, from http://www.technos.net/tq_09/4adams.htm
- Bredenkamp, S., & Copple, C. (Eds.). (1997). *Developmentally appropriate practice in early childhood programs* (Rev. ed.). Washington, DC: National Association for the Education of Young Children.
- Brooker, L. (2003). Integrating new technologies in UK classrooms: Lessons for teachers from early years practitioners. *Childhood Education*, 79, 261-267.
- Clements, D., & Sarama, J. (2003). Young children and technology: What does the research say? *Young Children*, 58, 34-40.
- Ethiopian Tourism Commission. (2003). *Cultural Ethiopia*. Addis Ababa, Ethiopia: Author.
- Hoot, J., Szente, J., & Mebratu, B. (in press). Early education in Ethiopia: Progress and prospects. *Early Childhood Education Journal*.
- Kaku, M. (1997). *Visions: Science revolution for the twenty-first century*. New York: Basic Books.
- Ministry of Education (MOE). (2002). *The federal democratic republic of Ethiopia: Education statistics (2000/01)*. Addis Ababa, Ethiopia: EMPDA.
- Murphy, K. L., DePasquale, R., & McNamara, E. (2003). Meaningful connections: Using technology in primary classrooms. *Young Children*, 58, 12-18.
- National Association for the Education of Young Children. (1996). Technology and young children—ages 3 through 8. NAEYC Position Paper. Retrieved November 30, 2003, from www.naeyc.org/resources/position_statements/pstech98.htm
- Negash, T. (1996). *Rethinking education in Ethiopia*. Uppsala, Sweden: Reprocentralen HSC.
- Ngan, M., Lee, C. J., & Koo, R. D. (2003). Voices and implementation of information technology in an elementary school classroom: A Hong Kong case study. *Childhood Education*, 79, 268-275.
- United States Agency for International Development (USAID). (2002). *USAID/Ethiopia-Success stories: Girls' primary school persistence increased under USAID grants programs*. Retrieved November 10, 2003, from www.usaid.gov/regions/afr/ss02/ethiopia2.html
- Peterson, T. (2000). A lesson in computer literacy from India's poorest kids. In P. Judge (Ed.), *Business Week Online*. Retrieved November 14, 2003, from <http://asia.businessweek.com/print/bwdaily/dnflash/mar2000/nf00302b.htm?db>
- SeokHoon, A. S. (2003). Promoting IT in childhood education: How Singapore prepares for a different future. *Childhood Education*, 79, 283-286.
- Szente, J. (2003). Teleconferencing across borders: Promoting literacy—and more—in the elementary grades. *Childhood Education*, 79, 299-306.
- Taylor, H. H. (2000). Technology: A key to the future. *Head Start Bulletin*, 66, 1.
- Thirumurthy, V., & Sundaram, N. (2003). Computers for young children in India. *Childhood Education*, 79, 307-313.
- Warschauer, M. (2000). Technology and school reform: A view from both sides of the tracks. *Education Policy Analysis Archives*, 8(4). Retrieved November 24, 2003, from <http://apaa.asu.edu/epaa/v8n4.html>
- World Factbook, The. (2003). Retrieved November 10, 2003, from www.cia.gov/cia/publications/factbook/geos/et.html

Web Sites

- Association for Childhood Education International: www.acei.org
- Center for Applied Technologies in Education (CATE), Buffalo, NY: www.cate.buffalo.edu/html
- International Children's Digital Library: www.icdlbooks.org/
- King Center Charter School, Buffalo, NY: www.kingcentercharterschool.org
- National Association for Early Childhood Teacher Educators: www.naecte.org
- National Association for the Education of Young Children: www.naeyc.org
- WNED Buffalo • Toronto: www.wned.org

Note: This article was made possible through support provided by the U.S. Agency for International Development (USAID), Bureau for Ethiopia, under the terms of Award No. #663A000000352-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID. Authors also wish to thank the USAID/Ethiopia team: Cheryl Kim, Director, Human and Institutional Development, Democracy and Governance; Abera Makonnen, Team Leader Human & Institutional Development; and Befekadu Gebretsadik, Project Manager.